

Impact of the KISS Program on Sexually Transmitted Infections (STIs) Awareness: Participants Insight and Implication

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Abstract: Background: Sexually transmitted diseases (STDs) remain a significant public health concern as more than 2.5 million infected in 2021, necessitating effective educational interventions to promote knowledge and safe practices. The study analyzes secondary data using SPSS. The dataset includes pre- and post-interventional data of KISS (Knocking out Infections through Safer-sex and Screening) intervention, which includes Sexually transmitted infections (STIs) knowledge assessment scale score among a group of military personnel and their spouses at an army base in Washington. Result: The study found that STIs knowledge increased from 15 to 25 (66.6%) on a scale of 30 after the intervention. Paired sample t test indicates a significant increase in knowledge scores following intervention ($p < 0.01$). After intervention, 92.4% participants were more likely to practice safe sex. In addition, the intervention found to be positively correlated (Pearson correlation, $p < 0.05$) in their responses. Almost all participants were confident talking about STIs (97%), comfortable with their group (97%), comfortable asking questions (95.5%), were willing to get screened regularly for STIs (94%), and to recommend to a friend (88%). Thematic analysis revealed 40% participants decided to practice safe sex whereas about 16% of respondents expressed the intention to ask the doctor to perform regular screening tests. None of the demographic variables showed a significant association with the knowledge assessment scores ($p > 0.05$). Conclusion: The intervention KISS found effective in improving knowledge and behavior of STIs prevention along with high participant acceptance suggests its potential for broader implementation to diverse populations and settings with a control group on a larger scale.

Keywords: STDs, STIs, knowledges, KISS intervention, safe sex.

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Introduction

Sexually transmitted infections (STIs) are a major public health concern. The prevalence of STIs in United

States in 2018 was amounted to be about 68 million which equates to one in five people (Kreisel et al., 2021). The healthcare costs resulting from 26 million new STI cases that year reached approximately \$16 billion (Chesson et al., 2021). Sexually transmitted diseases (STDs) have disproportionate distribution affecting predominantly marginalized groups vulnerable to social and economic factors. According to the latest report by Centers for Disease Control and Prevention (CDC), almost half of the new STIs in the United States are diagnosed in young individuals aged 15 to 24 years old. STI rates among US military is persistently high, particularly among women (Deiss et al., 2016; Noiman et al., 2020). The high prevalence of these diseases is thought to be associated with a lack of knowledge on the transmission of these infections and on prophylaxis and therapy (Suominen et al., 2017).

The consequences of long term STIs are multifaceted, impacting not only individual health but also societal well-being, particularly in terms of healthcare costs and social attitudes. STIs can cause health problems like infertility, ectopic pregnancy, chronic pain, newborn disease, and increased HIV risk, as well as socio-economic problems like economic burden, shame, and stigma (Kostera & Santiago, 2020). The occurrence of STDs is often related to modifiable sexual behaviors, and many people underestimate their risk (Massuda et al., 2019; Tabler et al., 2018).

There are several forms of intervention for STDs awareness available and offered through both in-person and digital delivery methods. However, it is imperative to assess the intervention's efficacy that can effectively modify high-risk sexual behaviors, prevent transmission, and improve health. Overall, the existing work indicates that a clear understanding of STI awareness program efficacy is yet to meet expectations (Evans et al., 2020). Further investigation is needed to identify the effectiveness, issues and concerns that can, ultimately, be addressed to improve feasibility, acceptance, and behavior adoption outcome in young adults, as they are a high-risk group for STIs. This is desirable because sexual awareness program have immense potential to support healthy sexual practice, lower the STD incidence, and healthcare burden associated with it (Jayes et al., 2022; Zizza et al., 2021).

With this rationale in mind, we aim to enhance the current research prospect by examining the efficacy of the KISS (Knocking out Infections through Safer-sex and Screening) Program which was implemented for promoting awareness about STIs among a group of young military personnel and their spouses. Researchers collected pre- and post-intervention knowledge data, and post intervention feedback were collected for participants as quantitative and qualitative data. In this study, we investigated participant's experiences with the KISS intervention, particularly effectiveness, and utility using both quantitative and qualitative analytic approach. This research contributes in several significant ways: firstly, it provides an in-depth exploration of the intervention's effectiveness and offers insights for potential enhancements to maximize its efficacy. Secondly, the findings can be compared with existing other intervention procedures to assess the best possible model to implement for sexual awareness program. Finally, a thematic qualitative analysis was conducted for deeper understanding of the participant's level of commitments regarding post intervention sexual health behavior.

The rest of the paper is structured as follows. The study's methods and materials, analysis, findings, and discussion are covered. Moving forward in conclusion, we acknowledge the study and framework limitations, as well as future potential research directions based on the implications and findings of the study.

Method

The primary pilot study was conducted at the Madigan Army Medical Center (MAMC) on the Joint Base Lewis-McChord military base in Washington, U.S. over a period from October 2016 to May 2017 (Kunz et al., 2022). Participants inclusion criteria were young individuals aged 18 to 30, who were either active-duty Army personnel or medical beneficiaries of the personnel and were HIV-negative at the time of enrollment. No participants were pregnant or trying to conceive and had no scheduled deployments within the subsequent three months. The focus of this study was to implement the "Knocking-out Infections through Safer-sex and Screening" (KISS) intervention among participants. This educational intervention aimed to enhance knowledge and promote safer sexual practices to reduce sexually transmitted infections (STIs) incidence.

Knocking-out Infections through Safer-sex and Screening (KISS) intervention is acknowledged as an awareness session on STIs by the CDC in the USA. It is a single interactive sexual education group session administered in groups of 5 to 8 participants of the same gender. The session was conducted by a trained study health educator from the research team. The objective of this session is to reduce STIs incidence by promoting increased condom usage. Before the intervention began, knowledge assessments were conducted to establish the participants' baseline understanding of sexual health and STIs. The primary researcher introduced diverse vignettes representing various racial and ethnic backgrounds to enhance inclusivity.

A reassessment was conducted at the end of the intervention. The assessment consisted of thirty questions regarding the knowledge of STIs, STDs, safe sex behavior. Participants received one point for each correct answer. Additionally, a post interventional feedback was collected to understand participant's perception and the level of commitment regarding healthy sexual behavior after the intervention. Participants perception was assessed with a set of Likert questions demonstrated later in the article. The level of commitment towards healthy sexual practice was assessed with an open-ended question "What would you do differently after today?". Some recommendations by the participants were also collected with another open ended question "What did you hope to learn today but did not?".

In this research study, deidentified, publicly accessible secondary data of this pilot study was obtained from Harvard database (Kunz, 2022). Statistical analysis was utilized to investigate the impact of the Knocking-out Infections through Safer-sex and Screening (KISS) intervention among the young adult military personnel. Descriptive analyses were conducted to assess the survey response distribution among the participants. The study compared pre- and post-intervention knowledge assessment score to evaluate the effectiveness of the KISS intervention by paired t test. Qualitative thematic analysis was carried out to analyze the open-ended

questions. All Likert items were assessed with correlation test to determine the interactive strength and direction of questionnaire items. Demographic variables were examined as potential predictors of baseline knowledge assessment scores. All statistical analyses were carried out using SPSS version 26.0. A two-tailed p-value cutoff for statistical significance was set at 0.05 with a 95% confidence level.

Results

Quantitative Analysis

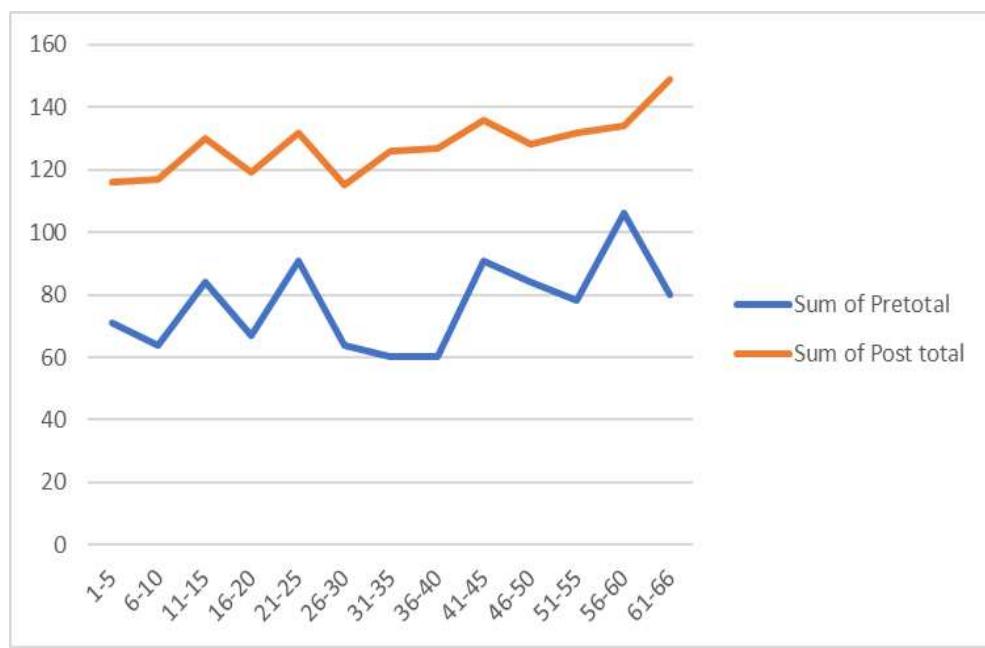


Figure 1. Score before and after the intervention

A paired samples t-test with an α of .05 was used to compare the mean knowledge assessment scores measured by 30 item questionnaires of 66 young adult participants before ($M=15.15$, $SD=5.72$) and after ($M=25.17$, $SD=3.34$) one hour KISS intervention. Mean score for knowledge assessment increased from 15 to 25 (66.6%) on a scale of 30 after the intervention. Visual inspection of the histograms for both pre-and post-test scores and their differences indicated that the assumption of normality was not violated. The paired sample t-test revealed that on average, knowledge assessment scores in the post-test were 10.01 points more, 95% CI [-11.24, -8.78] than the pre-test scores. The difference was statistically significant, $t(65) = -16.29$, $p < .001$, two-tailed. Paired sample t test indicates a significant increase in knowledge scores following intervention ($p < 0.01$). The effect size was estimated utilizing Cohen d criteria and significantly large, $d = 2.14$.

$$\text{Cohen's } d = (M_2 - M_1) / SD_{\text{pooled}} = 2.14$$

$$SD_{\text{pooled}} = \sqrt{(SD_{12}^2 + SD_{22}^2) / 2}$$

M_1 = mean of pretest, M_2 = mean of post test, s_{pooled} = pooled standard deviations for the two groups.

Table 1. Pair sample t test, Mean score difference among participants before and after Intervention

	Mean (Standard Deviation)	t (df)	p value
Pre-score	15.15 (5.72)	-16.253(65)	<0.001
Post-score	25.17 (3.34)		

Note: N=66, p value is significant at <0.05, with 95% Confidence Interval

K-mean cluster analyses of the Likert items feedback was performed, 65 participants out of 66 took one single group of membership, hence was not appropriate to proceed. However, it reveals a consistent pattern of positive agreement among participants regarding the intervention's impact. Almost all participants were confident talking about STDs (97%), comfortable with their group (97%), comfortable asking questions (95.5%), were willing to get screened regularly for STIs (94%), and to recommend to a friend (88%). 92.4% participants were more likely to practice safe sex after the intervention. Figure 2 demonstrates the Likert items and their responses distribution by the participants.

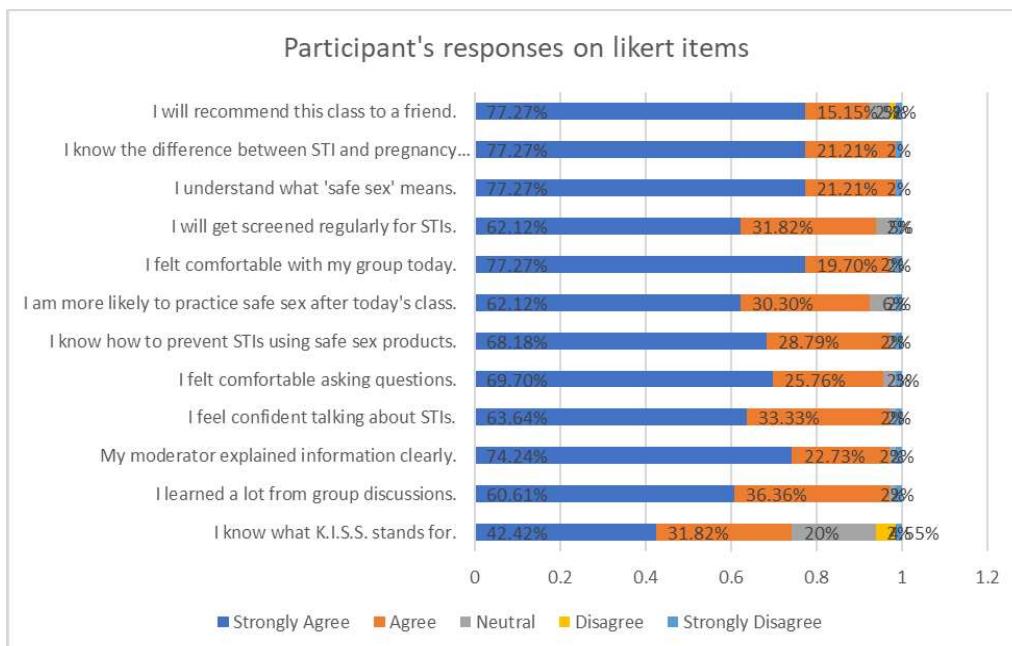


Figure 2. Participant's responses on Likert Items

The summary statistics presented in table 2 demonstrates the distribution and central tendencies of baseline knowledge assessment scores within various subgroups of four independent variables: Gender, Education, Race, and Marital Status. For Gender, males (n=31) have an average score of 16.09 and a variance of 36.75, while females (n=35) average 14.31 with a variance of 28.57. Participants with a bachelor's degree (n=3) show the highest average score of 20 and low variance of 7, while the High school diploma or GED equivalent group

(n=22) has an average score of 14.09 with a variance of 31.41. Among the races, White participants (n=26) exhibit the highest average score of 17.3 and a variance of 26.94, while Other (n=8) has the lowest average of 10.12 and a variance of 34.12. Marital Status shows that individuals in a committed relationship (n=6) have the highest average score of 18.5 and a variance of 29.1, whereas those who are single (n=29) have an average of 13.13 and a variance of 36.9.

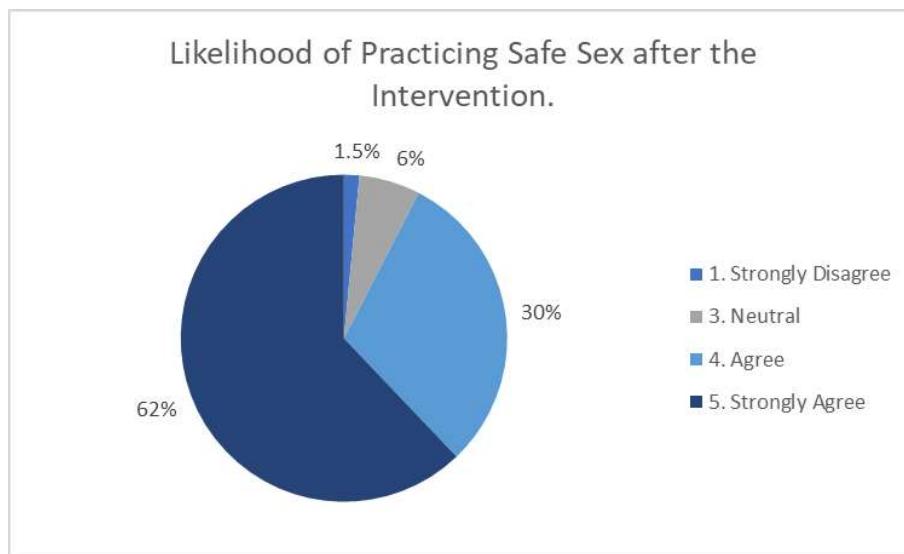


Figure 24. Likelihood of practicing safe sex after the intervention.

Table 2. Summary statistics of baseline knowledge across the demographic variables

Groups	Count	Sum	Average	Variance
Gender				
Male	31	499	16.09	36.75
Female	35	501	14.31	28.57
Education				
High school diploma or GED equivalent	22	310	14.09	31.41
Some College	27	391	14.48	37.79
Associate degree	7	112	16	32.66
Bachelor's degree	3	60	20	7
Vocational/technical school	4	72	18	2
Post graduate (e.g., MS, PhD, MD)	3	55	18.33	46.33
Race				
African American	23	332	14.43	23.71
Hispanic	9	137	15.22	44.69

Groups	Count	Sum	Average	Variance
White	26	450	17.3	26.94
Other	8	81	10.12	34.12
Marital status				
Single	29	381	13.13	36.9
In a committed relationship	6	111	18.5	29.1
Married	20	329	16.45	24.47
Separated	6	95	15.83	20.96
Divorced	4	58	14.5	12.33

A one-way between-groups analysis of variance (ANOVA) was used to investigate the impact of gender (male, female), race (African American, Hispanic, White, Other), education (high school diploma or GED equivalent, some college, associate degree, bachelor's degree, vocational/technical school other than military, completed graduate or professional degree e.g., MS, PhD, MD), marital status (single, in a committed relationship, married, separated, divorced) on baseline knowledge assessment score of the participants regarding STIs and healthy sexual practices. Inspection of the skewness, kurtosis indicated that the assumption of normality for the dependent variable (baseline knowledge assessment score) was not violated. There was no statistically significant difference at the $p < .05$ level in STIs knowledge scores any of the groups of the independent variables (Table 3).

Table 3. Impact of demographic independent variables on dependent baseline knowledge

Factor	Source of Variation	SS	df	MS	F	P-value	F crit
Gender	Between Groups	52.23	1	52.23	1.61	0.21	3.99
	Within Groups	2074.25	64	32.41			
	Total	2126.49	65				
Education	Between Groups	175	5	35.05	1.07	0.38	2.3
	Within Groups	1951	60	32.52			
	Total	2126	65				
Race	Between Groups	334.864	3	111.62	3.86	0.05	2.75
	Within Groups	1791.62	62	28.89			
	Total	2126.49	65				
Marital status	Between Groups	221.25	4	55.31	1.85	0.12	2.52
	Within Groups	1785.73	60	29.76			
	Total	2006.98	64				

Qualitative Analysis

The open-ended question prompted participants to reflect on their plans for sexual health and what they hoped to learn. A qualitative thematic analysis of the responses was conducted. The feedback survey questionnaire administered after the intervention had two open ended questions, "What would you do differently after today?" and "What did you hope to learn today but didn't". The thematic analysis of responses revealed several key themes.

First, participants expressed intentions to adopt safer sexual practices, with a significant emphasis on using condoms (either male or female) and practicing safe sex. At least 40% percent of respondents specifically mentioned their commitment to this approach. Twenty nine percent of participants referred to 'other' strategies such as using the right lubricant, having fewer sexual partners, and maintaining caution in their sexual activities. Ten percent of respondents expressed a desire to educate others about safe sex practices, and several participants expressed a desire to talk more about safe practices. Screening and vaccination were mentioned by 16% and 4% of participants, respectively. The screening theme reflects a commitment to regular testing for sexually transmitted infections. The HPV vaccination theme suggests an interest in vaccination to prevent HPV-related health issues.

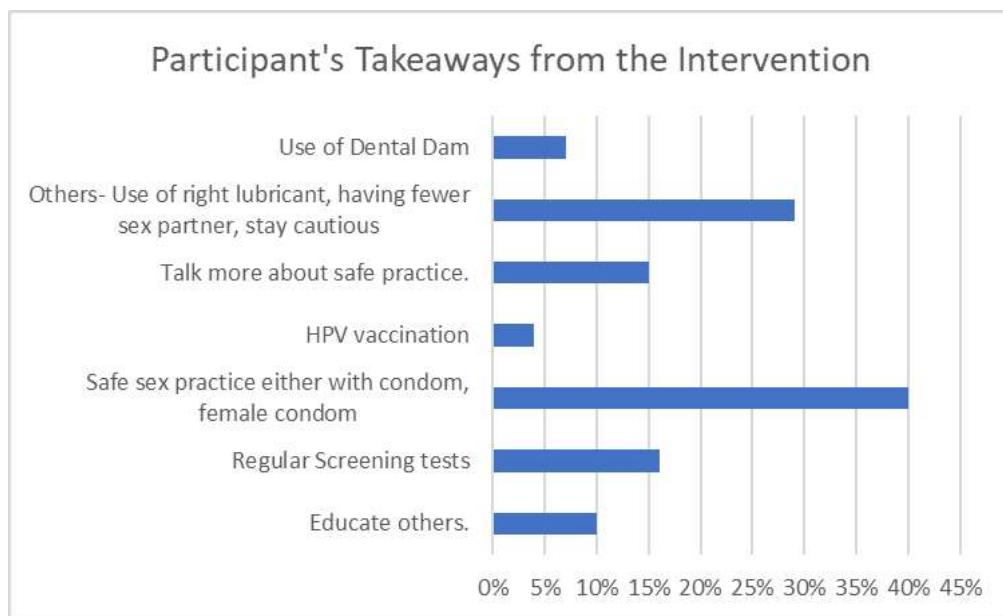


Figure 4. Participants' response to open ended questions

As for what participants hoped to learn but didn't, the answers reveal quite a few recommendations by the participants. The responses primarily revolved around the timing of testing after unprotected sex, recycling of needles, information about genitalia and personal experiences, new HPV vaccines, coping with post-unprotected sex anxiety, and pregnancy prevention/contraception.

Discussion

The findings of our study indicate a significant knowledge increase among participants regarding STDs and safe sexual behavior following KISS intervention. In line with the study findings, other investigations showed that participant's knowledge regarding STDs improved following STDs awareness program intervention (Widman et al., 2019; Zizza et al., 2021). We identified a study featuring a culturally tailored intervention, and it demonstrated a substantial reduction in the odds of STI incidence by 54% (Gilbert et al., 2021). It may suggest that culturally tailored interventions are particularly effective. The feedback of the KISS intervention was mostly positive. Demographic variables of interest (gender, race, education, marital status) does not seem to significantly affect baseline knowledge level.

Open ended questions reveal a greater level of commitment to healthy sexual practice by the participant including safe sex practice (40%), screening (16%) and HPV vaccination (4%). Similarly, 33% increase in HPV vaccination following the intervention have been reported by (Yoost et al. 2017), in contrast, another Australian study did not report in any change in HPV vaccination uptake due to implementation barrier (Davies et al., 2023). Those diverse findings indicate the importance of structural and methodological factors that can influence the effectiveness of interventions in promoting healthy sexual behavior. Additionally, open-ended questions provided valuable insights into how the contents of the intervention can be improvised such as post-exposure testing, needle recycling, genitalia education, new HPV vaccines, managing post-unprotected sex anxiety, and pregnancy prevention. These insights highlight the need for a more holistic approach to sexual health awareness programs. The KISS intervention's effectiveness in improving knowledge and behavior for the prevention of STIs along with high participant acceptance suggests its potential for broader implementation.

In our comprehensive review of the current state of the art, we have not come across any existing literature that presents a dual approach, encompassing both qualitative and quantitative analyses, to evaluate the effectiveness of the KISS program in promoting sexual health awareness or any other sexual health awareness program. The use of a pre- and post-intervention dataset allows for a robust assessment of the intervention's impact. The study reports a substantial increase in STIs knowledge following the KISS intervention, supported by statistical analysis. It also examines participants' attitudes and behaviors, demonstrating a positive correlation between knowledge and safe practices. The high acceptance and willingness of participants to engage in safe sex practices, along with their confidence in discussing STIs, indicate the intervention's effectiveness and potential for broader implementation. Furthermore, the study's thematic analysis provides valuable insights into the participants' intentions and decisions, enhancing the qualitative understanding of the intervention's effects.

However, it's crucial to acknowledge the limitations of our study. As a pilot study with no control group, we cannot establish a causal relationship between the intervention and increased awareness definitively. The small sample size also limits the generalizability of our findings, and potential confounders may not have been fully accounted for due to the secondary data analysis nature of the study. There are chances for response bias since

the responses are self reported.

Building on the findings of this study, future research should consider longitudinal approach with an inclusion of control group in the research design for an in-depth understanding of how the intervention influences participants' knowledge and behavior. The findings can be compared with existing other intervention procedures to assess the best possible model to implement for sexual awareness program. Large participants pool from different demography can provide a comprehensive understanding of diverse needs and challenges of various populations, ultimately leading to more effective and inclusive strategies for promoting sexual health and STD awareness.

Conclusion

The rise of antibiotic-resistant strains of STDs, the ease of global travel and increasing rates of high-risk behaviors makes it challenging to prevent STD. In the face of these concerns, it is imperative to prioritize comprehensive sexual health education. The success of the KISS intervention showcases its potential to make a meaningful impact in the fight against STDs. It could be adaptable across diverse populations and settings, as indicated by the lack of significant demographic associations. The success of ongoing effort to reduce the prevalence of sexually transmitted diseases is largely influenced by population perception, knowledge and awareness. The KISS program has demonstrated its capacity to enhance knowledge and influence sexual health behavior positively, as reflected in the substantial increase in STIs knowledge scores and the heightened willingness to practice safe sex among participants. The study highlights the need for similar interventions on a larger scale to better understand the mitigation approaches to burden incurred by STIs.

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